

APPLICANT(S): POLIAKINE, Ran et al.

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REMARKS

The present response is intended to be fully responsive to all points of objection and/or rejection raised by the Examiner and is believed to place the application in condition for allowance. Favorable reconsideration and allowance of the application is respectfully requested.

Applicants assert that the present invention is new, non-obvious and useful. Prompt consideration and allowance of the claims is respectfully requested.

Status of Claims

Claims **1-15** are pending in the application.

Claims **1-15** have been rejected.

Claims **1** and **3** have been amended in this submission. Applicants respectfully assert that the amendments add no new matter.

Claims **2, 4, 5, 7-9, 12 and 15** have been canceled without prejudice or disclaimer. In making this cancellation without prejudice, Applicants reserve all rights in these claims to file divisional and/or continuation patent applications.

Claim Objections

In the Office Action, the Examiner objected to claims 1 and 15 because of alleged informalities. Claims 1 and 15 have been amended in order to cure these informalities. Accordingly, Applicants request withdrawal of the objection.

Line 9 of claim 1 has been amended to read: "...light scattered and/or reflected by the LC layers" to overcome the objection for lack of antecedent basis for the term "the other layers" in line 9.

Claim 15 has been cancelled, thereby rendering moot the Examiner's objection.

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CLAIM REJECTIONS

35 U.S.C. § 102 Rejections

In the Office Action, the Examiner rejected claims 1, 4, 5, 7, 9, 10, 12, 13 and 15 under 35 U.S.C. § 102(b), as being anticipated by Kubota et al. (US Patent No. 6,147,726). Based at least on the reasons below, and the current amendment, Applicants traverse the rejection.

The Kubota reference, entitled Reflective Display Using Multiple Liquid Crystal Layers for Controllable Reflection, discloses:

A display device including a composite multi-layer film obtained by alternately laminating films and liquid crystal layers a plurality of times is held between one pair of substrates, and a voltage is applied to the composite multi-layer film to control the reflection factor of the composite multi-layer film. In the display device comprising a composite multi-layer film obtained by alternately laminating films and liquid crystal layers, a voltage being applied to the composite multi-layer film to control the reflection factor of the composite multi-layer film, a refractive factor... in a major axis direction, and a refractive factor... in a minor axis direction, of a liquid crystal used in the liquid crystal layers with respect to light having a predetermined wavelength..., and a refractive factor... and a refractive factor ... in X- and Y-axis directions which are perpendicular to each other in the film surface, of the films with respect to light having the predetermined wavelength... are set in at least one of combinations of films and liquid crystal layers, which are adjacent to each other...(Abstract)

However, the Kubota reference does not disclose a structure wherein (1) a plurality of LC layers are provided between addressable layers made of a plastic sheet or film, (2) the addressable layers and LC layers are provided between structural layers made of glass, and (3) addressable layers are provided on opposite sides of each one of the LC layers, and narrow conductive pathways are provided on opposing faces of the addressable layers on opposite sides of each one of the LC layers, the pathways respectively addressing a predetermined LC volume between the pathways, as recited in amended claim 1.

At least one advantage of the structure recited in claim 1 is that it may have low manufacturing cost, because the addressable layers and LC layers are easily assembled due to the addressable layers being made from plastic. For example, it is possible to take advantage of manufacturing techniques such as roll-to-roll manufacture. However use of plastic suffers

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from the disadvantage that the plastic has poor barrier properties, and the use of "engineered" plastic film with barrier layers is very expensive. This problem is overcome by the addressable layers and LC layers being arranged between structural layers made of glass. Due to the use of glass the structural layers can provide suitable barrier properties and can also provide suitable rigidity to the structure as a whole.

In this context, the plurality of addressable layers as recited in claim 1 may provide an advantage that the conductive pathways necessary for all the LC layers are provided on the addressable layers made of a plastic sheet or film. This allows the conductive layers to be applied cheaply as part of the manufacturing technique for the addressable layers. Otherwise, if the conductive pathways were applied on the structural layers made of glass, there would be a significant reduction in the advantage of reducing the manufacturing cost due to the use of plastic addressable layers.

In contrast, the Kubota reference discloses a structure in which a composite multi-layer film is used to reflect light, the film being arranged between two substrates made of glass or plastic. Each multi-layer film consists of plural LC layers alternating with plastic films. The purpose is to provide reflection at each interface between an LC layer and a plastic film. In the first to fifth embodiments (of Figs. 1 to 6), there is a single multi-layer film and conductive electrodes are provided on a surface of the substrate. In the sixth and seventh embodiments (of Figs. 7 and 8), there are plural multilayer films. Conductive electrodes are not provided on the plastic films within the multi-layer films. However, additional film layers 77, 98, 99 are provided between the multi-layer films and electrodes are provided on the substrates and the additional film layers 77, 98, 99.

Thus in the disclosure of these embodiments and in the alternative that the substrates are made of glass (rather than the alternative of plastic) Kubota does disclose a structure in which LC layers alternating with plastic layers are sandwiched between glass layers. However, Kubota does not disclose the addressable layers as recited in claim 1. In particular, Kubota does not disclose plastic layers on both sides of the outermost LC layers. Therefore, Kubota does not anticipate "addressable layers being provided on opposite sides of each one of the LC layers" as recited in claim 1.

Similarly in the Kubota reference, the conductive electrodes for the outermost LC layers are provided on the substrates. Therefore, the Kubota reference does not disclose

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“pathways are provided on opposing faces of the addressable layers on opposite sides of each one of the LC layers” as recited in claim 1.

Based at least on the above, amended claim 1 is novel over the teaching of the Kubota reference. In addition, amended claim 1 is also not obvious from the Kubota reference. In particular, it is noted that in the Kubota reference, due to the electrodes being provided on the glass substrates, the advantage of reduced manufacturing costs arising from the use of plastic addressable layers is significantly reduced, as discussed above, because it remains necessary to apply conductive pathways to the glass substrates, and in registration with the conductive pathways on the plastic addressable layers. The Kubota reference only contemplates conductive electrodes on the substrate, and indeed in the first to fifth embodiments (of Figs. 1 to 6) the conductive electrodes are only on the substrates. There is no teaching or motivation in Kubota to provide additional addressable layers having conductive pathways thereon, outside the outermost LC layers, nor is one to be found in the art at the time of the invention.

Therefore, claim 1, and claims 4, 5, 7, 9, 10, 12, 13 and 15 are allowable over the Kubota reference.

In the Office Action, the Examiner further rejected claims 1-10, 12, 13 and 15 under 35 U.S.C. § 102(b), as being anticipated by Matsumoto et al. (US Patent No. 6,844,957). Claim 2 has been cancelled, rendering the rejection moot as to this claim.

The Matsumoto reference, similarly to the Kubota reference, also discloses a structure in which LC layers 26, 27, 28 alternating with spacer layers 30, 31 are arranged between two substrates 32, 33 made of glass. Furthermore, Matsumoto discloses that the spacer layers may be made of plastic as an alternative to glass.

However, Matsumoto does not disclose the addressable layers as recited in claim 1, and as discussed above. In particular, there are no plastic layers on both sides of the outermost LC layers 26 and 28, so the recitation in claim 1 of “addressable layers being provided on opposite sides of each one of the LC layers” is not met by the Matsumoto reference. Similarly, in the Matsumoto reference, the recitation in claim 1 of “pathways are provided on opposing faces of the addressable layers on opposite sides of each one of the LC layers” is not met.

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Therefore, amended claim 1 is novel over the Matsumoto reference. In addition, claim 1 is not obvious based on the teachings of the Matsumoto reference. In particular it is noted that in the Matsumoto reference, the advantage of reduced manufacturing costs arising from the use of plastic addressable layers is significantly reduced, as discussed above. There is no teaching or motivation in the Matsumoto reference to provide additional addressable layers having conductive pathways thereon, outside the outermost LC layers 26 and 28.

Therefore, claim 1, and claims 3-10, 12, 13 and 15 are allowable over the Matsumoto reference.

35 U.S.C. § 103 Rejections

In the Office Action, the Examiner rejected claims 2, 3 and 6 under 35 U.S.C. § 103(a), as being unpatentable over Kubota et al. (US Patent No. 6,147,726) in view of Doane et al. (US Patent No. 7,170,481). The Doane reference does not overcome the deficiencies of the prior art discussed above with respect to claim 1 as amended. Therefore, because claims 2, 3 and 6 depend directly from claim 1, which as pointed out above, is allowable over the cited references, they are allowable.

In the Office Action, the Examiner rejected claim 8 under 35 U.S.C. § 103(a), as being unpatentable over Kubota et al. (US Patent No. 6,147,726) in view of Matsumoto et al. (US Patent No. 6,844,957). Claim 8 has been cancelled, thereby rendering moot the Examiner's rejection.

In the Office Action, the Examiner rejected claims 11 and 14 under 35 U.S.C. § 103(a), as being unpatentable over Matsumoto et al. (US Patent No. 6,844,957) in view of Yamakawa et al. (US Patent No. 6,697,039). The Yamakawa reference does not overcome the deficiencies of the prior art discussed above with respect to claim 1 as amended. Therefore, because claims 11 and 14 depend directly or indirectly from claim 1, they are allowable over the cited art.

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In the Office Action, the Examiner rejected claims 11 and 14 under 35 U.S.C. § 103(a), as being unpatentable over Kubota et al. (US Patent No. 6,147,726) in view of Yamakawa et al. (US Patent No. 6,697,039). Claims 11 and 14 are allowable, at least as depending from an allowable base claim 1.

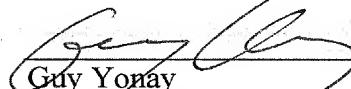
These rejections, so far as they relate to the remaining dependent claims, are respectfully traversed on the basis that the remaining dependent claims are allowable by virtue of their dependency on allowable claim 1.

In view of the foregoing amendments and remarks, the pending claims are deemed to be allowable. Their favorable reconsideration and allowance is respectfully requested.

Should the Examiner have any question or comment as to the form, content or entry of this Amendment, the Examiner is requested to contact the undersigned at the telephone number below. Similarly, if there are any further issues yet to be resolved to advance the prosecution of this application to issue, the Examiner is requested to telephone the undersigned counsel.

Please charge any fees associated with this paper to deposit account No. 50-3355.

Respectfully submitted,



Guy Yonay
Attorney/Agent for Applicants
Registration No. 52,388

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Pearl Cohen Zedek Latzer, LLP

1500 Broadway, 12th Floor

New York, New York 10036

Tel: (646) 878-0800

Fax: (646) 878-0801